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Assessment of ASEAN BAU-Emissions Reduction Targets: How Do They Measure Up?

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Abstract

In the lead up to the new 2015 climate agreement that will supersede the Kyoto Protocol, studies are being done to determine the effects of countries' pledges on the global emission level in 2020 as well as to analyze the size of the gap between this emissions level and the level needed to keep within the 2°C temperature rise to prevent runaway climate change. As part of the Cancun Agreements, 45 developing (non-Annex I) countries have pledged mitigation action plans, of which 16 countries, including seven major emitting countries, have submitted quantified mitigation actions in the form of either business-as-usual (BAU) or intensity reduction targets. Of the 16, Singapore and Indonesia are from Association of Southeast Asian Nation (ASEAN) member States, with Papua New Guinea, who has Special Observer status in ASEAN. The study analyses the contributions made by ASEAN member States in setting their BAU scenarios and targets, identifying the policies, legislations, decisions and assumptions which underpin them. Policy implications will be identified based on a shared desire to: 1) enhance action plans in specific sectors, 2) prepare appropriate energy efficiency policies, 3) shift from fossil-based energy to non-fossil energy, and 4) rationalize energy pricing mechanisms. The importance of using accurate energy consumption statistics in determining mitigation targets in ASEAN will also be discussed.

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Keywords: climate change; targets; baseline; emissions reduction; ASEAN; business-as-usual

1. Introduction

Southeast Asia's rapid economic growth in the last two decades has been associated with a sharp rise in energy consumption. According to the ASEAN Centre for Energy, energy consumption in ASEAN is expected to increase from 200 million tons of oil equivalent (MTOE) in 2000 to approximately 580 MTOE in 2020. As signatories to the United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol, and as part of their

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commitment to the convention process, each Southeast Asian country has to develop its own national climate change strategy and consider ways to reduce emissions such as by setting mitigation commitments. Presently, as non-Annex I Parties, Southeast Asian countries have no obligation to set quantitative targets for greenhouse gas (GHG) emissions [1]. However, the UNFCCC process now targets the 2015 for a series of paramount decisions that will usher in a new era of climate change response, including the possibility of binding all the world's nations to measurable targets to curb GHG emissions.

Developing countries tend to choose baseline or BAU targets to report because of its bottom-up nature. A baseline scenario is simply a set of reasonable assumptions and data that best describe future changes in emissions most likely to occur in the absence of activities taken to meet a mitigation goal [2]. However, measurability and comparability of BAU emission reduction targets are more challenging as they require projections based on assumptions for a range of emissions drivers and are dependent on modeling techniques, which can range from simple to complex. With baseline scenario goals, countries may also vary with regard to their inclusion of implemented, adopted, and planned policies, as well as the methods for estimating their effects, posing additional challenges to comparability [3].

All commitment types require: transparent methodologies for the estimation of emissions and removals; a clearly defined scope of gases, sectors and source/sink categories covered by the mitigation commitments; and agreed global warming potentials (GWP) to convert individual gases to a total emission value in CO_2-eq [4]. As part of the Cancun Agreements, 45 developing (non-Annex I) countries have pledged mitigation action plans, of which 16 countries, including seven major emitting countries, have submitted quantified mitigation actions in the form of either BAU or intensity reduction targets.

This paper focuses on the information and assumptions built into scenarios modeled by ASEAN countries as part of a study done by the Economic Research Institute of ASEAN and East Asia (ERIA) since 2007 [4]. The paper starts off with the knowledge that all ASEAN Member States have developed baseline scenarios, which have not necessarily resulted in formally announced emissions reduction targets. At the international stage, only Indonesia and Singapore have submitted national mitigation commitments to the UNFCCC as Nationally Appropriate Mitigation Actions (NAMAs) under the Cancun Agreement. While the study conducted by ERIA encompasses all countries participating in the East Asia Summit, this paper only focuses on ASEAN countries.

1.1. Methodology

This paper analyses the contributions made by all ASEAN member States in setting their BAU scenarios and targets, identifying the policies, legislations, decisions and assumptions which underpin them. Setting baselines involves not only analyzing technical data and making assumptions e.g. on future projections, but also considering policy choices driven by the intended application of the baseline [5]. Both the technical and political consideration can have impacts on the environmental ambition of a baseline in relation to an emissions goal or target. This paper presents key considerations in establishing emissions baselines and challenges in ensuring environmental integrity of baselines, as well as comparability across countries. To do this, it is imperative to understand if countries use simple extrapolation top-down models or hybrid models that combine elements of top-down and bottom-up models, in order to overcome the limitations of both types. However, the onerous requirements of hybrid models, in terms of both data and expertise, seem to make them difficult to apply in most countries [6].

2. Findings

The choice of the base year to conduct BAU analysis affects the emissions trajectory for a country, creating different emission profiles each year for the studies. For instance, Indonesia currently uses 2010 as a reference year to calculate its baseline emissions, whereas Thailand takes 2008 as a base year due to information constraints [7]. Such differences render it difficult for countries to trust one another to provide fair and accurate statistics to make unbiased comparisons about each country's emissions.

Adapting the results from ongoing studies organized by ERIA [8, 9], for over two separate years (see Table 1 and 2), the BAUs vary between -36.7 mt-C (metric tonnes of carbon equivalent) in Indonesia to +11.7 mt-C in Malaysia. Such distinctions in the BAU resulted in differing mitigation potentials as calculated from the LEAP model as adapted from the study, with Philippines registering the largest discrepancy. There are two primary reasons for this. The first involves policy updates factored in the BAU that are not available in the previous year of study. As governments announce targets on a yearly basis, this also creates expectations which are factored into the BAU scenarios by the analysts accordingly.

Table 1 and 2 CO_2 Mitigation Potential for ASEAN using 2009 and 2010 as baselines respectively

Country	BAU (Mt-C)	APS (Mt-C)	Mitigation Potential
Brunei	2.4	2.2	9.09%
Cambodia	2.6	2.3	13.04%
Indonesia	206.3	164.5	25.41%
Laos	4.7	4.6	2.17%
Malaysia	61.3	56.2	9.07%
Myanmar	7.1	6.6	7.58%
Philippines	48	36	33.33%
Singapore	17.2	16.7	2.99%
Thailand	79.5	74.5	6.71%
Vietnam	72.5	65.4	10.86%
Total	**501.6**	**429**	**16.92%**

Country	BAU (Mt-C)	APS (Mt-C)	Mitigation Potential
Brunei	2.1	1.8	16.67%
Cambodia	2.4	2.2	9.09%
Indonesia	169.6	134.1	26.47%
Laos	5.3	5.1	3.92%
Malaysia	73	60.9	19.87%
Myanmar	5.8	5.6	3.57%
Philippines	33.3	29	14.83%
Singapore	23.3	22.8	2.19%
Thailand	77.7	66.3	17.19%
Vietnam	73	64.8	12.65%
Total	**465.5**	**392.6**	**18.57%**

The ERIA study used updated IEA datasets on primary energy consumption and final energy demand for each year. As figures get updated yearly, particularly when statistics become more accurate or there is a change of methodology in which the statistics are being used for, such changes affect the input equations that are produced from economic regressions conducted on the data, hence giving a different outlook altogether. For example, in Singapore's case, energy consumption for Industry Natural Gas went from 330 MTOE to 801 MTOE from 2005-2010 in 2010's dataset. However, the figures increased to 398 MTOE to 1011 MTOE in the following year. Such differences will expectedly increase 2020 consumption forecast as well.

Looking into the energy intensity targets set by some ASEAN countries, differences emerge too, where Thailand, Singapore and Brunei uses year 2005 as a reference. However, Indonesia has set a target of 1% energy reduction per year without explicitly stating the base year. Similarly, Malaysia set a 10% reduction target relative to BAU without specifying the base year as well. The base year for the BAU case in which absolute emission targets are based on are also unclear, and it is expected that each country uses differing years as well.

A second concern is the planning horizon within which energy targets are set. Countries tend to choose varying target years to work towards their energy goals causing lack of comparability across ASEAN Member States. For example, Vietnam and Malaysia have differing CO_2 emissions intensity targets. While Vietnam focuses on realizing a short term goal by 2015, Malaysia has plans up till 2030. On the other hand, Singapore and Indonesia have harmonized their targets to 2020 due to their commitments to UNFCCC.

3. Conclusion

In the ERIA study, every country uses the simple extrapolation LEAP model (bottom-up) to account for the BAU GHG emissions and energy use towards 2020 and 2030. This helps to facilitate understanding amongst the ASEAN countries, making it easier for each to detect, account for and advise one another on matters with regards to matters on the figures generated from the constructed energy trajectories.

However, the energy model on which national inventories are based on can vary. Thailand and Indonesia use LEAP to build their BAU profiles because they are highly accessible, and are flexible when it comes to building different scenarios for analysis. LEAP gives an aggregated energy outlook that is not as data-intensive as optimization

models such as MARKAL (top-down) and general equilibrium models, requiring less specific parameters such as appliance-level consumption and technology figures. This makes LEAP ideal to use for large developing countries which are characterized by information-scarcity due to the lack of proper channels or mechanisms to collect energy data. Such countries typically have more pressing concerns on hand that supersedes energy management and environmental issues, and are unable to channel funds and effort towards collecting such information.

Further studies will have to be conducted to ascertain the transparency, quantifiability, comparability, verifiability and level of ambition of ASEAN emissions-reduction BAU targets.

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Biographies

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Allan is an Energy Analyst at the Energy Studies Institute. His research interests primarily involve energy modelling and analyzing energy efficiency options in the residential and commercial sectors. Since September 2012, Allan has been part of an Economic Research Institute of East Asia (ERIA) study that aims towards consolidating energy outlooks for the ASEAN and East Asia region.